NEOTROPICAL BIOLOGY AND CONSERVATION

Neotropical Biology and Conservation
17(1): 103–110 (2022)
doi: 10.3897/neotropical.17.e81465

SHORT COMMUNICATION

Recent observations of *Dermochelys coriacea* (Vandelli, 1761), in the waters of Pacific Panama

Eric E. Flores[1,2]

1 *Coiba Scientific Station (COIBA AIP), Gustavo Lara street, building 145B, City of Knowledge, Clayton, PO Box 0843-01853, Panama, Panama*
2 *Panama Wildlife Conservation, 162 Westbourne Grove, W11 2RH, London, UK*

Corresponding author: Eric E. Flores (eflores@coiba.org.pa)

Academic editor: Piter Boll | Received 1 February 2022 | Accepted 9 March 2022 | Published 22 March 2022

Citation: Flores EE (2022) Recent observations of *Dermochelys coriacea* (Vandelli, 1761), in the waters of Pacific Panama. Neotropical Biology and Conservation 17(1): 103–110. https://doi.org/10.3897/neotropical.17.e81465

Abstract

The situation of the Eastern Tropical Pacific subpopulation of the leatherback sea turtle (*Dermochelys coriacea*) is critical due to the drastic declines of nesting females. Evidence of the presence of leatherback sea turtles along the Pacific coast of Panama is anecdotal and is based on the local knowledge of local residents. I present here an uncommon observation of a subadult and an adult *D. coriacea* in the waters off the coast of Azuero Peninsula in central Panama. These observations indicate the need for intensive surveys along this coast that in part may rely on key local informants to urgently implement conservation efforts for this species.

Keywords

Boat strikes, Eastern Tropical Pacific, ETP, leatherback sea turtle, Pacific Panama

The leatherback sea turtle (*Dermochelys coriacea*) is one of the four species of sea turtles reported in the waters of the Eastern Tropical Pacific (ETP) (Seminoff et al. 2012). In particular, the subpopulation of the leatherback sea turtle in the ETP is considered to be under a high risk (i.e., low population viability and genetic diversity) and high threat (i.e., direct and indirect anthropogenic factors) situation (Wallace et al. 2011), driving the population to near extinction (Sarti-Martinez et al. 2007; Wallace et al. 2013). This subpopulation nests on coasts ranging from Mexico through Ecuador and is genetically distinct from other subpopulations in the Pacific

Copyright *Eric E. Flores*. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

(Dutton et al. 1999). Important nesting sites of leatherback occur in Mexico (e.g., Colola, Tierra Colorada, Playa de bahia Chacahua, Playa de la Escobilla, Maruata), Costa Rica (e.g., Playa Naranjo) and Nicaragua (e.g. Salamina, Veracruz de Acayo) with nesting reported in small numbers or sporadically in Panama, El Salvador, Colombia and Ecuador (Pritchard 1994; Rgues-Baron et al. 2019).

It is known that the individuals in this subpopulation remain in oceanic waters, with foraging sites off the coasts of Panama, Colombia, Ecuador, Peru, and Chile (Shillinger et al. 2008; Bailey et. al. 2012). In the Pacific, the nesting period extends from October to March, with females nesting between 3 to 10 times per season, and an average of 80 eggs per clutch (Reina et al. 2002; Eckert et al. 2012). Throughout the Pacific coast of Panama, there is no evidence about the abundance of leatherback sea turtles, regardless of anecdotal nesting events (Arauz et al. 2017; Flores et al. 2021). Meanwhile, satellite tracking data shows that some specimens travel along the waters near to the country's Pacific coast (Shillinger et al. 2008).

Herein, I present evidence of two observations of leatherback sea turtles in the open waters of the Pacific coast of central Panama. The first observation occurred on 2 April 2021 at 11:30 am, approximately 5 km from Granada beach at the coast of Azuero peninsula (7.1626°N, 80.6888°W, Fig. 1). A juvenile leatherback sea turtle with curved carapace length (CCL) < 1 m was seen swimming near the surface of the water. The behavior was recorded with a video using an Android mobile phone, where the juvenile appeared to be feeding near the surface with a remora fish (family Echeneidae) attached to the upper part of the carapace (Suppl. material 1: Leatherback_1). The second observation occurred on 22 August at 11:46 am, approximately 6 km from La Marinera beach and close to a submarine mountain called Whaoo rock in the coast of Azuero Peninsula (7.2324°N, 80.3575°W, Fig. 1). A close inspection of the adult animal revealed that it had a wound on its head, which was presumably caused by a boat strike, thus preventing the animal from swimming in a normal position (Suppl. material 2: Leatherback_2). These rare encounters occurred while a sport fishing tour operator crew was fishing in open waters in the coast of Los Santos Province.

At the ETP, female leatherbacks migrate from nesting beaches in Mexico, Nicaragua and Costa Rica to feeding grounds in the southeastern Pacific (Pritchard 1994; Shillinger et al. 2008; Rgues-Baron et al. 2019). However, satellite data shows that some females migrate from Costa Rica nesting sites to the Pacific waters of Panama (Shillinger et al. 2008). It is possible that the two animals reported herein may relate to a distant population at the ETP, but they also may belong to a local population, since small numbers of leatherbacks are reported to nest in Pacific Panama (Rgues-Baron et al. 2019), particularly along the west coast of Coiba National Park which is located 120 km west from the Azuero peninsula. This area has also been documented as a nesting site (Rodríguez and Ruíz 2011).

Although the first observed animal could not be measured directly, its relative size of CCL < 1 m, suggest it was a juvenile, since the smallest reproductive females in the ETP have a CCL of 1.05 m (Stewart et al. 2007). Observations of juvenile leatherbacks throughout the Pacific Ocean are rare and only few published reports

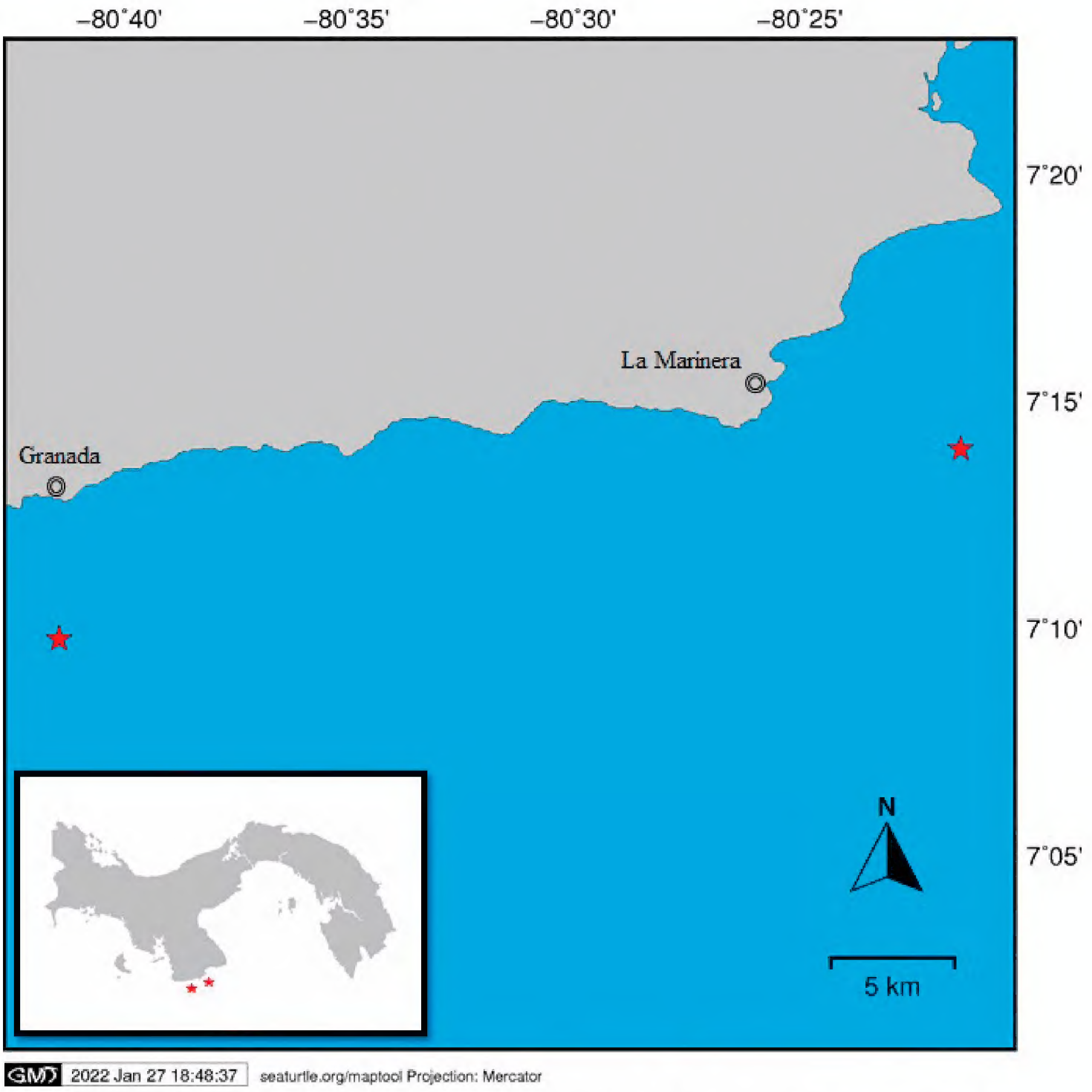

Figure 1. Location of the juvenile (red star, left) and adult (red star, right) leatherback off the coast of Azuero Peninsula in southern Panama. Base map source Maptool program for analysis and graphics a product of SEATURTLE.ORG (www.seaturtle.org).

exist from fishery records (Eckert 2002). The scarce information about the natural history of early life stages indicates that once they hatch and abandon the natal beach, juveniles go to open ocean areas where they change from a period of passive drift behavior using the marine currents to an active swimming behavior looking for warmer waters (Gaspar et al. 2012). It has been hypothesized that smaller juveniles prefer warmer waters, perhaps due to a threshold of physiological capacity (Eckert 2002). The day the juvenile was observed the sea surface temperature was 28.7 °C (NOAAView Data Exploration Tool https://www.nnvl.noaa.gov/view/globaldata.html#SURF) offering some support for this hypothesis.

The observation of adult leatherbacks in the waters of the ETP is uncommon. In particular, the waters off the coast of the Azuero peninsula are affected by two marine currents, the North Equatorial Countercurrent (NECC) (Guzman and Breedy

2008) during the rainy season (May to November) and the Panama flow (Glynn and Mate 1997) during the dry season (December to April) which bring nutrient-rich waters to the surface. These conditions may prove suitable for the different life stages of offshore species like the leatherback sea turtles.

Common reports of leatherbacks sightings at sea refer to animals trapped in fishing gears or nets (Frazier and Brito Montero 1990; Seminoff and Dutton 2007). In terms of commercial fisheries in particular, longline fisheries are responsible for incidental capture of sea turtles including leatherbacks in the ETP (Frazier and Brito Montero 1990). In addition, considerable rates of injuries caused by collisions with commercial and recreational vessels are threatening marine fauna worldwide (Nowacek et al. 2004; Wilke et al. 2005; Calleson and Frohlich 2007), including sea turtles (Hazel et al. 2007; Thomas 2008; Casale et al. 2010; Denkinger et al. 2013; Yaghmour 2020). The area where the injured adult leatherback was observed is frequented by sport fishing, artisanal and commercial fishing vessels, even from foreign countries (Arauz 2008; Castrejon and Bucaram 2020), which increases the probability of a boat strike.

To my knowledge, this account is the only published report of a juvenile and an adult leatherback sea turtles in the open waters of the Pacific Panama. Although single and isolated in principle, these observations may indicate the current use and importance of these waters as corridors for early and mature stages of leatherbacks and reinforce previous field work informing anecdotic events of females nesting in the Azuero Peninsula (Flores et al. 2021). In addition, these data contribute to the strategic goals of the Regional Action Plan to reverse the decline of leatherbacks in the Eastern Pacific, specially increasing the knowledge about the distribution of juvenile individuals (https://docs.google.com/file/d/1WjIK4SG0qFFynByPuqGsq0vWIDBN5C7y/view?rm=minimal).

Part of the area where the observations occurred was designated in 2010 as a special marine and coastal management zone by the Ministry of Environment of Panama, to protect marine and coastal resources and to maintain the biodiversity of its ecosystems. However, the implementation of a proper management plan for this zone is pending, including boaters consultation and regulation of commercial fisheries to minimize bycatch and reduce potential threats like boat strikes on sea turtles (see Fuentes et al. 2021). The sport fishing tour operator who made the observations at sea was part of a citizen science sea turtle conservation project in the vicinity of the Azuero Peninsula. This demonstrates the value of having a local network of trained personnel and highlights the importance of continuing efforts to promote responsible activities to reduce bycatch and other threats in these waters that are part of the habitat of the largest sea turtle in the world.

Acknowledgements

I thank Adriano Gonzalez Barria from Pesca Cambutal Panama fishing club, who kindly provided the videos and the location of the observations for this paper; and to Joelbin De La Cruz from Panama Wildlife Conservation who acompanied me during our visits to the area of Cambutal. I also thank Jessica Gross who helped me with

reviewing this paper. This particular citizen science project was an initiative funded by the Small Grant Program from The Global Environmental Fund in Panama. Dr. Eric E. Flores is a member of Sistema Nacional de Investigación (SNI) in Panama.

References

Arauz D (2008) Caracterización de las pesquerías industrial y artesanal del camarón y langosta en Panamá. OSPESCA-SICA-FAO, Panamá, 47 pp. https://www.sica.int/download/?65341

Arauz EA, Pacheco L, Binder S, de Icaza R (2017) Diagnóstico de la Situación de las Tortugas Marinas en Panamá y Plan de Acción Nacional para su Conservación. Ministerio de Ambiente de Panama, Panama, 103 pp. https://www.gacetaoficial.gob.pa/pdfTemp/28237_A/60353.pdf

Bailey H, Benson SR, Shillinger GL, Bograd SJ, Dutton PH, Eckert SA, Morreale SJ, Paladino FV, Eguchi T, Foley DG, Block BA, Piedra R, Hitipeuw C, Tapilatu RF, Spotila JR (2012) Identification of distinct movement patterns in Pacific leatherback turtle populations influenced by ocean conditions. Ecological Applications 22(3): 735–747. https://doi.org/10.1890/11-0633

Calleson CS, Frohlich RK (2007) Slower boat speeds reduce risks to manatees. Endangered Species Research 3: 295–304. https://doi.org/10.3354/esr00056

Casale P, Affronte M, Insacco G, Freggi D, Vallini C, d'Astore PP, Basso R, Paolillo G, Abbate G, Argano R (2010) Sea turtle strandings reveal high anthropogenic mortality in Italian waters. Aquatic Conservation 20(6): 611–620. https://doi.org/10.1002/aqc.1133

Castrejon M, Bucaram SJ (2020) Diagnóstico integral del secto pesca y acuicultares de la República de Panamá. Banco Interamericano de Desarrollo. Nota técnica IDB-TN-02011. https://doi.org/10.18235/0002668

Denkinger J, Parra M, Muñoz JP, Carrazco C, Murillo JC, Espinosa E, Rubianes F, Kosh V (2013) Are boat strikes a threat to sea turtles in the Galapagos Marine Reserve? Ocean and Coastal Management 80: 29–35. https://doi.org/10.1016/j.ocecoaman.2013.03.005

Dutton PH, Bowen BW, Owens DW, Barragan A, Davis SK (1999) Global Phylogeography of the leatherback turtle (*Dermochelys coriacea*). Journal of Zoology 248(3): 397–409. https://doi.org/10.1111/j.1469-7998.1999.tb01038.x

Eckert SA (2002) Distribution of juvenile leatherback sea turtle *Dermochelys coriacea* sightings. Marine Ecology Progress Series 230: 289–293. https://doi.org/10.3354/meps230289

Eckert KL, Wallace BP, Frazier JG, Eckert SA, Pritchard PCG (2012) Synopsis of the biological data on the Leatherback Sea Turtle (*Dermochelys coriacea*). Biological Technical Publication, U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington D.C., 158 pp. http://seaturtle.org/library/EckertKL_2012_USFWSTechReport.pdf

Flores EE, De La Cruz J, Seminoff A, Ureña L (2021) Local ecological knowledge supports identification of sea turtle nesting beaches in Panama. Herpetological Conservation and Biology 16(2): 238–250.

Frazier JG, Brito Montero JL (1990) Incidental capture of marine turtles by the sword-fish fishery at San Antonio, Chile. Marine Turtle Newsletter 49: 8–13.

Fuentes MMPB, Meletis ZA, Wildermann NE, Ware M (2021) Conservation interventions to reduce vessel strikes on sea turtles: A case study in Florida. Marine Policy 128: 104471. https://doi.org/10.1016/j.marpol.2021.104471

Gaspar P, Benson SR, Dutton PH, Réveillère A, Jacob G, Meetoo Ch, Dehecq A, Fossette S (2012) Oceanic dispersal of juvenile leatherback turtles: Going beyond passive drift modeling. Marine Ecology Progress Series 457: 265–284. https://doi.org/10.3354/meps09689

Glynn PW, Mate J (1997) Field guide to the Pacific coral reef of Panama. In: Lessios HA, Macintyre IG (Eds) Proceeding 8th International Coral Reef Symposium Vol. 1. University of Panama and Smithsonian Tropical Research Institute, Panama.

Guzman H, Breedy O (2008) Distribución de la diversidad y estado de conservación de los arrecifes coralinos y comunidades coralinas del Pacífico Occidental de Panamá (Punta Mala-Punta Burica). Panama. The Nature Conservancy, Arlington, Virginia, 40 pp. https://doi.org/10.3411/col.08031450

Hazel J, Lawler IR, Marsh H, Robson S (2007) Vessel speed increases collision risk for the green turtle *Chelonia mydas*. Endangered Species Research 3(2): 105–113. https://doi.org/10.3354/esr003105

Nowacek DP, Johnson MP, Tyack PL (2004) North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. Proceedings. Biological Sciences 271(1536): 227–231. https://doi.org/10.1098/rspb.2003.2570

Pritchard PCH (1994) Nesting of the Leatherback Turtle, *Dermochelys coriacea* in Pacific Mexico, with a new estimate of the world population. Copeia 4: 741–747. https://doi.org/10.2307/1444081

Reina RD, Mayor PA, Spotila JR, Piedra R, Paladino F (2002) Nesting ecology of the leather back turtle *Dermochelys coriacea*, at PN Marinos La Baula, Costa Rica: 1988 to 1999–2000. Copeia 3: 653–664. https://doi.org/10.1643/0045-8511(2002)002[0653:NEOTLT]2.0.CO;2

Rguez-Baron JM, Kelez S, Liles M, Zavala-Norzagaray A, Torres-Suárez OL, Amorocho DF [Eds] (2019) Sea turtles in the East Pacific Ocean Region: MTSG annual regional report 2019. IUCN-SSC Marine Turtle Specialist Group Annual Regional Report 2019.

Rodríguez J, Ruíz A (2011) Caracterización de playas de anidación de tortugas marinas en el Parque Nacional Coiba, provincia de Veraguas, Panamá. Conservación Internacional. Panama, 39 pp.

Sarti-Martinez L, Barragán AR, García-Muñóz D, García N, Huerta P, Vargas F (2007) Conservation and biology of Leatherback turtle in the Mexican pacific. Chelonian Conservation and Biology 6(1): 70–78. https://doi.org/10.2744/1071-8443(2007)6[70:CABOTL]2.0.CO;2

Seminoff JA, Dutton PH (2007) Leatherback turtles (*Dermochelys coriacea*) in the Gulf of California: Distribution, demography, and human interaction. Chelonian Conservation and Biology 6(1): 137–141. https://doi.org/10.2744/1071-8443(2007)6[137:LTDCIT]2.0.CO;2

Seminoff JA, Alfaro-Shigueto J, Amorocho D, Arauz R, Baquero A, Chacón-Chaverri D, Gaos AR, Kelez S, Mangel JC, Urteaga J, Wallae BP (2012) Biology and conservation of sea turtles in the eastern Pacific Ocean: A general overview. In: Seminoff JA, Wallace BP (Eds) Sea Turtles of the Eastern Pacific Ocean: research advances, conservation challenges and signs of success. University of Arizona Press, Tucson, Arizona, USA, 11–39. https://doi.org/10.2307/j.ctv21hrddc.5

Shillinger GL, Palacios DM, Bailey H, Bograd SJ, Swithenbank AM, Gaspar P, Wallace BP, Spotila JR, Paladino FV, Piedra R, Eckert SA, Block BA (2008) Persistent Leatherback Turtle migrations present opportunities for conservation. PLoS Biology 6(7): e171. https://doi.org/10.1371/journal.pbio.0060171

Stewart K, Johnson C, Godfrey MH (2007) The minimum size of leatherbacks at reproductive maturity, with a review of sizes for nesting females from the Indian, Atlantic and Pacific Ocean basins. The Herpetological Journal 17(2): 123–128.

Thomas J (2008) Bycatch of loggerhead sea turtles: Insights from 14 years of stranding data. Endangered Species Research 5: 161–169. https://doi.org/10.3354/esr00116

Vandelli D (1761) Epistola de holothurio, et testudine coriacea ad celeberrimum Carolum Linnaeum equitem naturae curiosum Dioscoridem II. Conzatti, Padua.

Wallace BP, DiMatteo AD, Bolten AB, Chaloupka MY, Hutchinson BJ, Abreu-Grobois FA, Mortimer JA, Seminoff JA, Amorocho D, Bjorndal KA, Bourjea J, Bowen BW, Briseño Dueñas R, Casale P, Choudhury BC, Costa A, Dutton PH, Fallabrino A, Finkbeiner EM, Girard A, Girondot M, Hamann M, Hurley BJ, López-Mendilaharsu M, Marcovaldi MA, Musick JA, Nel R, Pilcher NJ, Troëng S, Witherington B, Mast RB (2011) Global conservation priorities for marine turtles. PLoS ONE 6(9): e24510. https://doi.org/10.1371/journal.pone.0024510

Wallace BP, Tiwari M, Girondot M (2013) *Dermochelys coriacea* (East Pacific Ocean subpopulation). The IUCN Red List of Threatened Species 2013: e.T46967807A46967809. https://doi.org/10.2305/IUCN.UK.2013-2.RLTS.T46967807A46967809.en [downloaded on 25 May 2021]

Wilke M, Bossley M, Doak W (2005) Managing human interactions with solitary dolphins. Aquatic Mammals 31(4): 427–433. https://doi.org/10.1578/AM.31.4.2005.427

Yaghmour F (2020) Anthropogenic mortality and morbidity of marine turtles resulting from marine debris entanglement and boat strikes along the eastern coast of the United Arab Emirates. Marine Pollution Bulletin 153: 111031. https://doi.org/10.1016/j.marpolbul.2020.111031

Supplementary material 1

An adult Leatherback sea turtle in the waters of Pacific Panama

Authors: Adriano Gonzalez Barria

Data type: multimedia

Explanation note: An adult Leatherback sea turtle (*Dermochelys coriacea*), apparently injured, is seen on the waters off the coast of Azuero Peninsula in Pacific Panama.

Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: https://doi.org/10.3897/neotropical.17.e81465.suppl1

Supplementary material 2

A junenile Leatherback sea turtle in the waters of Pacific Panama

Authors: Adriano Gonzalez Barria

Data type: multimedia

Explanation note: A juvenile Leatherback sea turtle (*Dermochelys coriacea*) is seen actively swimming on the waters off the coast of Azuero Peninsula in Pacific Panama.

Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: https://doi.org/10.3897/neotropical.17.e81465.suppl2